**HIMALAYAN COLLEGE OF GEOMATICS ENGINEERING**
**Year III Semester IV**
**Course: Advanced GIS and DBMS**
**Assignment 1**

**Due date: 2081/4/25**

1. How Thiessen polygon is being created? Explain it with examples. Illustrate how Thiessen polygon is used to solve certain real field problem.
2. How does network analysis is done in GIS environment? Explain real field problems that can be solved by network analysis.
3. Suppose the input layer shows a county and the overlay layer shows a national forest. Part of the county overlaps the national forest. We can express the output of an Intersect operation as [county] AND [national forest]. How can you express the outputs of a Union operation and an Identity operation?
4. You are given the following information on a 30-meter DEM:
   UTM coordinates in meters at the lower-left corner: 560635, 4816399
   UTM coordinates in meters at the upper right corner: 570595, 4830380
   How many rows does the DEM have? How many columns does the DEM have? What are the UTM coordinates at the center of the (row 1, column 1) cell?
5. Compute flow direction, flow accumulation and pour point using the following original elevation data.

| | | | | | |
|---|---|---|---|---|---|
| 102 | 96 | 95 | 97 | 88 | 78 |
| 97 | 94 | 87 | 79 | 76 | 79 |
| 95 | 85 | 70 | 65 | 66 | 78 |
| 89 | 88 | 86 | 34 | 52 | 35 |
| 95 | 89 | 75 | 33 | 25 | 28 |
| 98 | 85 | 53 | 19 | 16 | 19 |

6. Discuss on the status of data interoperability in context of Nepal.
7. Write SQL statement and result of it to answer the following questions from the following tables.

Table: Cities

| CityID | CityName | State | Population | Latitude | Longitude |
|---|---|---|---|---|---|
| 1 | Springfield | Illinois | 116250 | 39.7817 | -89.6501 |
| 2 | Denver | Colorado | 727211 | 39.7392 | -104.9903 |
| 3 | Miami | Florida | 478251 | 25.7617 | -80.1918 |
| 4 | New York | New York | 8419600 | 40.7128 | -74.0060 |
| 5 | Los Angeles | California | 3980400 | 34.0522 | -118.2437 |
| 6 | Chicago | Illinois | 2716000 | 41.8781 | -87.6298 |
| 7 | Houston | Texas | 2328000 | 29.7604 | -95.3698 |
| 8 | Phoenix | Arizona | 1680000 | 33.4484 | -112.0740 |
| 9 | Philadelphia | Pennsylvania | 1584200 | 39.9526 | -75.1652 |
| 10 | San Antonio | Texas | 1547200 | 29.4241 | -98.4936 |

Table: Roads

| RoadID | RoadName | RoadType | Length | CityID |
|---|---|---|---|---|
| 1 | I-70 | Interstate | 669.7 | 2 |
| 2 | Lincoln Ave | Street | 15.2 | 1 |
| 3 | Ocean Drive | Avenue | 6.8 | 3 |
| 4 | Broadway | Street | 21.0 | 4 |
| 5 | Sunset Blvd | Boulevard | 22.0 | 5 |
| 6 | Michigan Ave | Avenue | 13.0 | 6 |
| 7 | Westheimer Rd | Road | 19.0 | 7 |
| 8 | Camelback Rd | Road | 11.0 | 8 |
| 9 | Market St | Street | 10.0 | 9 |
| 10 | Commerce St | Street | 14.0 | 10 |

Table: Parks

| ParkID | ParkName | Area | CityID |
|---|---|---|---|
| 1 | Washington Park | 0.65 | 2 |
| 2 | Lincoln Park | 1.2 | 1 |
| 3 | Bayfront Park | 0.32 | 3 |
| 4 | Central Park | 3.41 | 4 |
| 5 | Griffith Park | 17.0 | 5 |
| 6 | Millennium Park | 0.99 | 6 |
| 7 | Hermann Park | 1.8 | 7 |
| 8 | South Mountain Park | 16.3 | 8 |
| 9 | Fairmount Park | 8.0 | 9 |
| 10 | Brackenridge Park | 1.7 | 10 |

i. Write a query to select all columns from the cities table.
ii. Write a query to select “cityName” and ‘population” of cities located in the state of ‘Illinois”.
iii. Write a query to select the RoadName and Length of all roads that are more than 20 kilometers long.
iv. Write a query to select the `CityName` and `ParkName` for all parks.
v. Write a query to select the `CityName`, `RoadName`, and `RoadType` for all roads in 'Colorado'.
vi. Write a query to select the `CityName`, `ParkName`, and `Area` for parks that have an area larger than 1 square kilometer.
vii. Write a query to select the `CityName`, `Population`, `RoadName`, and `RoadType` for roads in cities with a population less than 500,000.

viii. Write a query to select the `CityName`, `State`, `ParkName`, and `Area` for parks in cities with a latitude greater than 40.

ix. Write a query to select the `CityName`, `ParkName`, and the total number of parks in each city.

x. Write a query to select the `CityName`, `RoadName`, `RoadType`, and `Length` for roads in cities located in 'Florida'.

8. Why we need data conversion in GIS. Explain the method of data conversion in GIS.
9. Compare and contrast Thiessen polygon, IDW and kriging interpolation method.
10. Write and discuss an example of local, focal and zonal operations in GIS environment.